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TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 93

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'INDIAN EXPRESS' EDITORIAL ON SIGNIFICANCE OF WORLD RADIO CONFERENCE

Delhi INDIAN EXPRESS in English 17 Sep 79 p 6 BK

[Editorial: "Sharing Radio Waves"]

[Text] India has done well to ask for an equitable distribution of geostationary satellite orbit space and frequency assignments in its proposals for the forthcoming World Administrative Radio Conference (WARC-79), due to begin in Geneva on September 24. This is only one among the several controversial aspects of the existing framework for use of the radio spectrum by various services in the 154 member-countries of the International Telecommunication Union (ITU).

When the existing guidelines were decided at the 1959 session of WARC, most developing countries were unaware of the potential of a rapidly growing communication technology and their future requirements. Hence, there was little protest from them when the developed countries pushed through the "first come first served" principle for use of geostationary satellite frequencies and orbit space. As a result, the geostationary orbit has become crowded by satellites of advanced countries, while the developing countries, who are now keen to launch their own communication satellites, are finding it hard to get their due share. For instance, India has had to cut down the emission power of its geostationary satellite planned for 1981 so as not to disturb the transmissions from satellites or developed countries already in existence.

This is why considerable significance is being attached to WARC-79 by the developing countries who, for the first time, constitute an overwhelming majority in the ITU. What is more, they will not have another chance to seek a change in the radio spectrum framework till 1999, when the next WARC is to be held.

Similarly, India's demand for expansion of shortwave broadcast bands will be shared by most developing countries as radio has become the cheapest means for propagating information and ideas. The other proposals on sharing of ultra high frequency bands for television networks and additional frequencies for radio astronomy are also important.

BRIEFS

POSTPONEMENT OF WARC OPENING--Geneva, Sept 24, (AFP)--The scheduled opening here today of the World Administrative Radio Conference (WARC) has been postponed because of failure to agree on a chairman. Delegation heads will meet on Wednesday to try to settle the problem. There are three candidates for chairman: T. V. Srirangan (India), Derek Rose (New Zealand), and Henry Kieffer (Switzerland). The deadlock is believed to be the work of the non-aligned countries, who want Mr Srirangan for chairman. He is, however, understood to be opposed by the industrialized countries. The 10-week conference aims at redistribution of airwaves. [Text] [Paris AFP in English 1844 GMT 24 Sep 79 NC]

CSO: 5500

AUSTRALIAN FIRM TO LAY INDIAN OCEAN TELEPHONE CABLE

Canberra THE AUSTRALIAN in English 27 Aug 79 p 13

[Text]

A $45 million order for the first submarine telephone cable system to be laid in the Indian Ocean has been awarded to the submarine systems division of Standard Telephones and Cables (STC) which is based at Southampton.

The 2,505 kilometre system will provide 480 telephone circuits, with signals boosted by 173 amplifiers, along the route between Madras in India and Penang in Malaysia.

STC said that the Madras-Penang link is the initial phase of the Indian Ocean Commonwealth cable system planned by seven Commonwealth companies including Overseas Communications Service of India, Jabatan Telekom of Malaysia, Cable and Wireless of the United Kingdom, Overseas Telecommunications Service of Sri Lanka, Overseas Telecommunications Commission of Australia, the Telecommunication Authority of Singapore and Teleglobe of Australia.

STC's submarine systems division will be responsible for the design, manufacture and installation of the entire Madras-Penang system.

More than 2,760 tonnes of steel, 240 tonnes of copper, 195 tonnes of aluminium, 1980 tonnes of polyethylene and 175 tonnes of polypropylene will be used in the system.

CSO: 5500

REQUEST FOR TENDER ON COMMUNICATIONS NETWORK RELEASED

Canberra THE AUSTRALIAN in English 27 Aug 79 p 13

[Text]

A request for tender for Phase 1 of the new Defence Integrated Secure Communications Network (DISCON) was released recently by the Minister for Defence, Mr Killen and the Minister for Administrative Services, Mr MacLeay.

The objective of DISCON was to provide secure telephone, telegraph, facsimile and date communications to interlink major defence establishments throughout Australia.

Total estimated cost of the project to begin during the 1980's was approximately $120 million.

The initial DISCON installation, Phase 1 of the project, would be in Queensland and the network would be extended by subsequent phases throughout Australia during the 1980's.

Tenders would close at the end of 1979, and selection of a prime contractor for DISCON Phase 1 was anticipated during 1980.

The current release of DISCON Phase 1 specifications and tender documents had been preceded by discussions over the past three years with the communications industry in Australia and overseas.

In February this year, Mr Killen announced that subject to further discussions, a short list of potential prime contractors would be invited to tender for the project.

As a result, the final list of companies now invited to tender for DISCON Phase 1 was: Ford Aerospace and Communications Corporation, Plessey (Australia) Limited, Litton Systems Incorporated and Rockwell International.

Significant Australian industry content in the project was expected, rising from an initial level of about 30 per cent to 60 percent as the program proceeded.

Specific arrangements already made between potential prime contractors and Australian companies provided a solid foundation to achieving those high-Australian industry content levels.

Australian-based communications companies had been deeply involved with potential prime contractors in the development of the DISCON concept and were expected to bid for major sub-contracting roles. Those companies included: Amalgamated Wireless (Australasia) Ltd., Philips Telecommunications Manufacturing Company Ltd., Rockwell-Collins (Australasia) Pty Ltd., Siemens Industries Ltd., and Standard Telephones and Cables PtyLtd.

Participation of some of these companies in the project would ensure a significant Australian content and the transfer of advanced digital communications technology to Australia.

It was intended that an Australian-based company, utilising its own resources, ultimately would assume prime system responsibility for DISCON. That arrangement would be a direct result of the Australian Government requirement that overseas companies and Australian-based companies worked closely together in the DISCON project.

Other Australian companies would be involved as minor sub-contractors.

CSO: 5500

TELISAI EARTH STATION TO BEGIN OPERATIONS

Kuala Belait BORNEO BULLETIN in English 28 Jul 79 p 10

[Text]

TELISAI. — Brunei's $16 million earth station at Telisai will be officially opened on September 23 by the Paduka Seri Begawan Sultan.

And with the opening of the station Brunei will have direct communication links to Hongkong, Singapore, Kuala Lumpur and the United Kingdom and will be capable of receiving live television coverage from most parts of the world.

To mark the opening the Post Office will be putting out a set of stamps showing the ultra-modern station and its dish-shaped antenna.

The dish, which is 40ft in diameter, arrived from Singapore recently and is currently at Muara waiting to be shipped to the site and assembled over a 14-day period.

The worldwide network of earth stations is co-ordinated in Washington by a United Nations organisation, Intelsat which has satellites positioned over the Atlantic, Pacific and Indian oceans and describe one orbit of the earth every 24 hours.

The Brunei complex is designated as a "B" station, meaning it has a smaller antenna than stations in several other countries, including Singapore which has a dish 100ft in diameter; the Brunei station is linked to the Indian Ocean satellite.

The Telisai site was chosen because the area is free from outside electrical interference that can cause serious problems for earth stations and is linked to Bandar Seri Begawan through the existing microwave link from Seria.

In September 1977 the Crown Agents put the work out to tender, the final job going to Harris International Communications of Florida on an $8 million contract; it also built the dish in the United States and shipped it to Muara.

Harris is also responsible for the running of the station for two years after it comes into operation and will use that time to try and train local staff to take over when its contract expires.

Architect for the project was the Robinson, Cassell Partnership and the builder was Brunei Construction.

A recent visitor to the station was the British High Commissioner, Mr Arthur Watson, who was shown round by the programme manager for Harris International, Mr Nick Tamirof.

The station is described by Harris as "self-sustaining" meaning that all critical systems are redundant and a sophisticated power back-up system, incorporating diesel generators and battery-powered inverters, will switch in very quickly if there is ever a major equipment breakdown or a power failure.

CSO: 5500

BRIEFS

ZHEJIANG SUBMARINE CABLES--Three 130-kilometer-long submarine cables have been laid recently between Wenzhou and Dongtou. The cables, linking the continent with four coastal islands, have improved communications in the area. A PLA unit assisted in the project. [Hangzhou Zhejiang Provincial Service in Mandarin 1100 GMT 20 Aug 79 OW]

MACAO-CANTON COMMUNICATIONS TALKS--A Macao government delegation, headed by Eng Aires da Silva, will shortly be going to Canton to discuss with the regional authorities there the possibilities for improving telegraph and telephone links between the province and the Portuguese territory. The delegation will also be holding talks with the Chinese authorities, envisaging the study of ways and means of cooperation in telecommunications, taking into account the substantial increase--amounting to some 300 percent--in the telegraphic traffic between the two regions. An improvement in the communications link between Macao and Canton will come following the commissioning, on 1 August, of direct links via satellite between Portugal's far eastern territory and Shanghai and Beijing. [Text] [Lisbon Radio in Portuguese to Europe 1230 GMT 15 Aug 79 LD]

CSO: 5500

JAPANESE MINISTER OF COMMUNICATIONS VISITS

Sofia IMPULS in Bulgarian 31 Jul 79 p 1

[Article by Yana Konstantinova: "Bulgarian-Japanese Cooperation in Communications"]

[Text] Japanese Minister of Communications Received by Comrade Todor Zhivkov

The Chairman of the State Council, Todor Zhivkov, on 26 July 1979 received the Japanese minister of posts and telecommunications Nikichi Shirahama who was on a friendly visit to our nation upon the invitation of the minister, Engr Pando Vanchev.

During the meeting there was a discussion of the possibilities of expanding professional contacts and cooperation between the two countries in the area of communications.

The meeting was attended by the minister Engr Pando Vanchev, as well as by the ambassadors of Bulgaria and Japan, Todor Dichev and Akiro Yamato.

Bulgarian-Japanese Cooperation in Communications

Upon the invitation of the minister of communications, Engr Pando Vanchev, a friendly visit was paid to Bulgaria by the Japanese minister of posts and telecommunications Nikichi Shirahama accompanied by co-workers and a group of journalists from the Japanese mass information media.

At the conversations held between the delegations of the two ministries, emphasis was put on their reciprocal desire to establish closer contacts, and to make communications a reliable bridge for the constantly broadening friendly ties between Bulgaria and Japan in the economy, culture and other areas of life.

The minister, Engr Pando Vanchev, expressed sincere satisfaction from this first visit by a Japanese minister of posts and telecommunications to

Bulgaria and defined it as a step ahead in the development of undoubtedly useful relations between the two similar ministries, and that this is in accord and with the desire of the governments of the two countries to cooperate more actively. He described the structure and organization of the communications system in Bulgaria over the immediate and longer-run periods of its development, as well as certain problems and tasks presently confronting communications. The Japanese minister N. Shirahama began his speech with thankful words for Bulgarian hospitality. In pointing to the high dynamics in the development of Bulgarian-Japanese relations, he emphasized the leading role of communications as a means for maintaining and extending friendly and professional contacts.

Mr Shirahama expressed thanks for the opportunity granted him to become acquainted with the activities and problems of communications in Bulgaria, and stated his readiness to assist in a closer rapprochement between the two ministries and the two countries, as well as in direct and mutually advantageous cooperation, the opportunities for which in the area of communications were discussed at this meeting.

The talks were attended by the ambassadors of Bulgaria and Japan, Todor Dichev and Akiro Yamato.

Mr Shirhama and the persons accompanying him visited the Kopitoto area near Sofia where a radio-television center is being built, and he inspected certain important sites in our capital.

The Japanese journalists had meetings at the Sofia Press Agency and at the Union of Bulgarian Journalists.

Prior to his departure from Bulgaria, at the Sofia air terminal, Mr Nikichi Shirahama stated:

"I am very pleased by the warm and sincere hospitality which your minister of communications and his co-workers have shown us.

"I am particularly happy that I had an opportunity to meet with and be received by the chairman of the State Council of your country, Mr Todor Zhivkov. I am exceptionally happy and pleased by the fact that during our talk I felt his great confidence and friendly feelings for Japan and the Japanese people and a sincere desire for cooperation.

"Your country is very beautiful. I was enchanted by Mt Vitosha which we visited.

"In leaving, I take with me the most lovely impressions of Bulgaria."

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HUNGARIAN REMOTE DATA PROCESSING SYSTEM TESTED IN USSR

Budapest MUSZAKI KOZLEMENYEK in Hungarian Vol 25 No 2, 1979 pp 83-85

[Article by Szilard Sass and Mihaly Koves, TERTA (Telephone Factory)]

[Summary] "Computer-technology development at TERTA advanced by a major step in October 1978: by completing the data-transmission multiplexer prototypes it became possible to create complete remote data-processing subsystems. After completion of the factory tests, the next step was an interministry test set up by the Soviet users. The USSR was the obvious site for the testing since TERTA has so far sold almost 2,000 terminals to the USSR. Among these was the TAP-2 (EC 8502) dialog batch terminal, of which the 1000th was delivered in 1978. The goal of the tests was to demonstrate the complex system made up of many types of terminal, to demonstrate the operation via actual communications channels, and to demonstrate the run of typical user programs, and at the same time to exhibit the multiplexor and terminal test programs developed at TERTA. The diagram shows the design of the tested system."

"The TERTA DOSzTOD remote data-processing system operated with the R-22 computer in a Soviet computer center under the control of the EC/DOS (BTAM) operating system.This article discusses only the system as a whole, the TMX-2410 multiplexor (which is a new development), the TETA-1210 and TETA-1220 group line units, and the TAP-X terminal, since the other devices are already known to the readers of this journal."

"In the first part of the test, individual devices and sectors of the system (such as the multiplexor, line couplings, communication channels, and terminals) were checked, partly from the engineering consoles of the devices and partly with the aid of the test programs developed for this purpose."

"During the second stage, the performance of the three user program systems demonstrated the usefulness of the system. It can be seen from the diagram that the system includes TAP-2, TAP-3, TAP-70, TAP-X, and AP-64 terminals. Most of these have already been installed earlier (for example, it is a well-known fact that the state data transmission system of the USSR is based on TAP-2 terminals). It thus became possible to use it in conjunction with various such terminals which, according to the original plans, was not part of the actual test."

"The TAP-X micrporocessor-containing terminal is a new product of TERTA. The version that was exhibited operates on the basis of the TAP-70 algorithm, and was equipped with an alphanumeric keyboard, 1600-character display, matrix printer, perforated-tape reader, and floppy disk. As a result of the microprocessor-based electronic system it became possible to solve user problems in the autonomous operating mode."

" The terminals communicated with the computer via various communication channels. In Kiev there were two TAP-2 terminals operating at the rate of 200 bits per second, connected via two-wire leased telephone channel to the remote TMX-2400 multiplexor installed in Kiev. The remote multiplexor was connected to its adapter via a leased four-wire telephone channel (the remote multiplexor is capable of bundling up to 22 data-transmission channels at a rate of 50 bits per second)."

"Another group of TAP-2 terminals operated via 200 Baud telegraph networks switched with PD-200. The terminals included in the test were located in Moscow, Kiev, and Tyumen."

"The third group of terminals was connected to the computer via the switched telephone network of Moscow. This group incouded TAP-2, TAP-3, TAP-70, and TAP-X terminals"

"In addition to terminals from TERTA, the system also included the AP-64 terminal from ORION. Connection to the multiplexor was provided by a four-wire leased telephone channel, using TERTA's TAM-603 full duplex modem."

"The line devices (TAM-201, TAM-601, and TAM-603 modems; TBA-1 automatic calling units, telegraph-line connectors and error protectors combined with the TTX-201 automatic calling unit) were built in groups. The functionally individual subassemblies may be used in their own right or in groups.The TETA-1210 and TETA-1220 group line units have a common supply unit and an engineering console permitting joint testing."

"The main feature of the test was the microprocessor-based data-transmission multiplexor made by TERTA."

"The system may be connected to medium and large-size ESER computers (from the R-20 and higher) and other computer systems with compatible channel (such as the IBM 360 and 370 systems). The connection is made to the multiplex channels of the computers. The two-channel switch permits connection to two multiplex channels also."

" The system test was carried out in two parts. The first part involved the checking of the multiplexor and the terminals for proper operation, using test sections. The second part involved the operation of the user programs operating under the DOS 2.2 operating system.

"Three user programs were run in the course of the test and the demonstration following the test. Each program executed the data interchange with the terminals with the aid of the ESER BTAM."

"The tests demonstrated the operability of the system. The simultaneous operation of the terminals was of interest. Obviously, greatest interest was shown in the local multiplexor and the microprocessor-based terminal."

"The equipment was submitted to the two major Soviet ministries concerned for experimental operation. TERTA demonstrated with this test that it is ready and able to act as a prime contractor for producing remote data-processing systems."

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[Diagram on p 84]

Fig. 1. The configuration tested
Key: 1 - Switched telegraph network
2 - Moscow cuty telephone network

SUCCESSFUL DEVELOPMENT AT COMMUNICATIONS FACTORY

Budapest MUSZAKI KOZLEMENYEK in Hungarian Vol 25 No 2, 1979 pp 82, 85

[Unattributed article; interview with Peter Eisler, chief development engineer of BHG (Beloiannisz Communications-Engineering Factory) on the enterprise's 1978 achievements and plans for 1979, as published in MEGAFON]

[Text] [Question] What were the featured tasks in the field of AR products?

[Answer] Insofar as the GDR market is concerned, a featured task was the implementation testing of the executive program for the register of the twin center in Karl-Marx-Stadt; in addition, we also performed work on the regional centers and on the twin centers working together in the GDR. These projects went according to plan; however, the success of our endeavors can be determined only after we have handed over the center in Karl-Marx-Stadt. This is scheduled for this year. This will be when we find out whether we passed or failed the test.

We can report of major work on the Czech telegraph system. We handed over two centers, one in Ceske Budejovice and another in Banska Bystrica, this year. This involved additional major development work, thus completing a long development project.

In the area of AR development, we found a new trading partner: We established market connections with Cuba. We developed new circuits in the framework of our cooperation with Cuba's telegraph system. This project deserves special mention since the AR development department developed 16 different circuits within a period of only three months. With the cooperation of the fittings-design and the design-planning departments, we completed the manufacturing

documentation by the end of the year. In my judgment this was one of our must successful developments last year. Of course, much still remains to be done before the first centers are actually installed.

[Question] Much has been heard in recent times about container centers.

[Answer] The preparation of this new design was another major activity in the area of container-type centers. The prototypes of three centers, each with a different function, were finalized before the end of the year.

[Question] What other developments were worked on?

[Answer] Adaptation of the ARL line concentrator to domestic conditions has been completed. The first prototype is ready; it was given to the Hungarian Postal Service for use testing. Among the major developments associated with the AR products I mention the mass-caller and electronic evaluator designed for Czech centers, which uses a special control unit. The equipment has significantly facilitated the cross-callability of the Czech centers. The fact that we already received an order indicates that the development was successful. The Czech Postal Service actually ordered several systems.

Preparation of a network simulator for the centers of various types used in the GDR is in progress for the last two years. Using microprocessors, we establish a highly intelligent system, which will help with the transfer of the centers in Karl-Marx-Stadt. This system, with stored program control, represents the latest state of the art. The project will be completed in 1979; presently we work intensively on writing the programs and program insertions.

We have emphasized this development right from the beginning since in this field we have no tried-and-tested approaches. We do have some difficulties: we lack certain equipment such as displays and perforated tape readers-writers. We had to find a way for operating without them. The system will be tried out this year, when the center in Karl-Marx-Stadt will be finally checked out and handed over.

Insofar as subcenters are concerned, we had to design two new centers for all practical purposes: the CA 42 C and CA 102 C types. Since the work has been started early in the year, and manufacture is already in progress, this was a development accomplished at extra-high speed.

The universal operating console is completed; it may be used with the CA 10002, the KA 5001, and the QA 512 subcenters. Development of the RX small-capacity center familiy proceeds according to plan.

We completed the Type KA 5001 large subcenter for the needs of today's market in addition to the planned activities. For all practical purposes, this system has an unlimited capacity, and also has a special technical advantage: It integrates the advantages of main and secondary centers, and may be used as a so-called centrex center. In network cooperation it has the characteristics of a main center with very favorable executing capability. It seems that this system will be the hit of the future since in addition to the above it can execute all subcenter functions which are offered in the most up-to-date electronic subcenters available on the capitalist market. Development will be completed next year, and we expect to be able to deliver in 1980 already. Since it is assembled from AR components, we expect to find a dependable long-time market.The Hungarian Postal Service has already ordered several thousands of lines. Let me state one more thing: We work on the prototype, the laboratory models are completed, and we are ready to start testing. In my judgment this development is a key one for the new year.

For a special market order we developed the MFC signal-type selection for centers of the CA 1002 type. This permits the setting up of a closed-target network in conjunction with ARM transit centers, using the CA network.

Much work was performed in the area of computer-technology applications. One such project was the computerized preparation of the external wiring of the centers; another was the development of a system supporting the preparation of engineering bids.

[Question] On what developments will you work in 1979?

[Answer] Some of the ongoing projects will be continued during 1979. Among these is the completion of the center in Karl-Marx-Stadt. This will be one of the largest telephone installations in the history of BHG.

Among the new development I first mention two: One is the preparation of the conversion of the Hungarian telephone network to eight digits; the other is the completion of new types of container center for the Hungarian Postal Service.

[Question] How much advancement is taking place in the field of electronic development?

[Answer] In electronic developments one of our major guidelines is the implementation of experiences already available with microprocessor applications. First of all we desire to develop further the network simulator

designed for the center in Karl-Marx-Stadt. On this basis we desire to develop an integrated traffic-measuring, traffic-analyzing, and operation-monitoring system which is badly needed for the modern maintenance centers already today and which is demanded by the customers.

Another idea of ours is aimed at eliminating imports. In this field we attempted to advance by more daring adaptations. What we mean is that we do not take over drawings in a slavish fashion, but we rework them so that they conform to our development approaches. This year the first such project is the development of modern switching stations, electronic tarif and timing pulse generating system, and replacement of imported centralographs designed for use in conjunction with the APM centers.

We shall continue with the development of new electronic devices. We start with the preparation of an entire family of boss-secretary devices and the development of the electronic telephone directory. Insofar as the latter is concerned, let me say that we have in mind a pocket-calculator sized device in which the most important telephone numbers can be programmed in. As a matter of fact, the second generation will also contain a clock, a calendar, and perhaps also an electronic calculator capability. We intend to develop the boss-secretary devices in this direction also.

[Question] May we also expect new developments in the field of design and construction?

[Answer] We start the development of a new product, namely the relay capable of being mounted on the NYAK card, in 1979. Another plan calls for the adaptation of a miniorganizer system to domestic conditions. Using this system, we could reduce the space requirements of our telephone centers by approximately 25 percent.

[Question] Which way are you moving in the area of research/development?

[Answer] We try to develop further the external wiring; we will also study the computer-assisted determination of the wiring of relay bands both of direct and conventional type. We will also study methods for measuring the service life of telephone-engineering devices, including computer-aided evaluation.

We will also try the computer-aided preparation of the traffic dimensioning and optimum layout of AR-type centers. This may be very useful in the long run since the computer, with the entered data, prepares quickly and accurately the entire production preparation and the required documentation. Of

course, these are complex tasks, which cannot be expected to be completed within a short period of time. This subject will be worked on for a period of several years. The above-mentioned traffic measuring and operation-monitoring system will give us another featured activity: establishment of the theoretical fundamentals of the system.

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THE GTT 8000/960 MICROWAVE RADIO RELAY EQUIPMENT

Budapest MUSZAKI KOZLEMENYEK in Hungarian Vol 25 No 2, 1979 pp 61-74

[Article by Dr. Andras Somogyi and Attila Deak, ORION]

[Summary] "The GTT 8000/960 system is a fully solid-state, heterodyne-type microwave relay system designed for the long-distance transmission of up to 960 FDM speech channels, or for the transmission of black-and-white or color television audio and video signals. The system operates in the 7725-8275 MHz and 7900-8400 MHz bands, on the basis of CCIR and CEMA frequency standards. It is a modern radio-relay system, which in Hungary was used for the first time in the Hungarian sector of the INTERSPUTNIK system. The equipment may be operated in the 0°-50°C temperature range."

"The networks assembled from the equipment conform to the recommendations of CCIR and CEMA. The fully solid-state, partially integrated circuitry permits the establishment of highly reliable and easy-to-maintain connections. The equipment may be operated with a d.c. supply of -24, -48, or -60 B directly, or—using a continuous supply source—with an a.c. network."

"Trunk connections may be established with the aid of the channel-reserve system operating among the medium-frequency points, the remote-control and remote-monitoring system, and service telephone channels (omnibus and express). The signals of the auxiliary devices must be transmitted under the signal band of the multichannel telephone signal. The GTT 8000/960 system may be adapted to other standard radio-relay systems or multiplex systems both on the intermediate frequency and the baseband."

"The radio-frequency and terminal devices were developed at ORION; the service channel reserve and remote-control systems were developed by the Research Institute of Telecommunication."

"The following basic services may be realized with the aid of the modems, the terminal devices, and the auxiliary devices:"

"a) Transmission of up to 960 channels of FDM baseband (60 kHz-4287 kHz) together with the pilot of the multiplex device over the individual broadband channels.
b) Transmission of black-and-white or color (SECAM or PAL) television programs, with a high-quality music channel.
c) Transmission of black-and-white or color (SECAM or PAL) television programs with four high-quality music channels.

The distribution of the up to eight radio-frequency channels among TV and TF channels may be made in any desired way with one restriction: Since the signals of the auxiliary devices are transmitted under the baseband of the TF channel, we must provide for the transmission of at least one TF channel (together with the common reserve channel assigned to it).
The GTT 8000/960 system is suitable for the establishment of a trunk network. It is also suitable for operating as a branch line of other trunk systems. In this case, connection may be at the intermediate frequency of the baseband, at CCIR-specified levels and impedances. The devices are designed for indoor installation; thus they may be accommodated in containers also."

"The following auxiliary services may be realized over the connections:"

"a) Sector telephone (omnibus) channel, which establishes connection between two baseband stations (modem sector) and all repeater stations between them.
b) Up to three express (long-distance) channels, which establish connection among main and terminal stations by means of calling over the entire length of the microwave chain.
c) Remote control, with the aid of which up to eight stations may be handled (remotely controlled and monitored) from a center at any end of the microwave chain.
d) Intermediate-frequency channel reserve, which provides pretection from equipment malfunctioning and fading, and which provides up to two reserve channels for six operational radio channels.
e) Baseband reserve, wherein one or two operational modulator(s) or demodulator(s) have one reserve each.

Transmission of the auxiliary services (a-d) is under the 960-channel baseband in the 0.3-54 kHz frequency spectrum. Baseband reserve requires no return-direction channel; thus, it can be realized in case of simplex TV transmission also."

"System-Engineering Features of the Design"

"A) As a result of the increased transmission capacity (960 channels, compared to 300 channels in the earlier design), the system parameters had to be increased; specifically, the transmission power for the system to 700 mW, the signal-to-noise ratio to 7.0 dB. Accordingly, of the noise level allowed by CCIR, 3 pW/km, we utilized 1 pW/km for the incoming-level noise at a fading of 5 dB.

B) In order to reduce the transmitter-receiver noise (local noise), we selected the base oscillator frequency of the receiving locale at approximately 125 MHz, and we installed a noise-cutting invar UHF filter at approximately 500 MHz.

C) In order to reduce the echo-type reflection noises, we designed the interfacing of the individual connected devices in such a manner that the total of the collision dampings became 50-60 dB. By using a novel antenna type and a circulator with improved parameters, we reduced the reflections originating on the feedline.

D) In order to reduce the intermodulation noises, we designed novel so-called resistor-coupled amplifiers. As a result, those transmission distortions which arose because of the simultaneous presence of the running-time curvature and conversion were eliminated. It thus became possible to provide low signal-to-noise ratios over a wide AGC range, as outlined in Item 1. Reduction of the level of the intermediate-frequency upper harmonics gave us improved intermodulation noise conditions (especially at the limiter inputs).

E) Changes in temperature significantly affect the transmission characteristics. As a result of the frequency shift of the microwave filters tuned for room temperature for amplitude and running time (if the filters are made of copper or aluminum), the running diagram and the amplitude characteristic will tilt. In the case of several stations connected in series, the faults add up quadratically, insofar as the overall effect is concerned. For this reason, the system would no longer conform to the noise provisions of the standards governing multichannel telephone systems if the transmission line is long and there are a few degrees C fluctuations (for example at sunrise or sunset). It therefore became necessary to use invar microwave filters in the three-cavity, four-cavity, and five-cavity cases.

F) In order to eliminate the systematic noise cumulation with consecutive sectors, we separated the correcting system into several parts.

- The -τ corrector following the main amplifier is called upon to correct the major part of the running-time distortion of the repeater station (transmitter-receiver filter-change filters channel filters for identical and adjacent channels, intermediate-frequency filters). This is where the entire carrier-frequency amplitude correction also takes place.

- The running-time corrector in the transmitter intermediate-frequency amplifier primarily corrects the "transmitter-mixer with filters" unit; however, in some sectors noise compensation can be realized by joint tuning with the main corrector.
- The active running-time corrector in the intermediate-frequency output amplifier has as its basic function to jointly correct the modem; however, in the case of several sectors it may also be used as the "accumulated running-time corrector."
- The corrector in the intermediate-frequency modulator jointly corrects the transmitter limiter and the modulator.

G) In order to improve the quality of the TV picture and the auxiliary audio carriers, we designed highly stable, low-noise circuits.

H) To improve the overall efficiency, we used converters with a switching frequency of approximately 200 kHz in the MODEM and TV terminal devices. The modulatable base oscillator supply unit accommodated in the SRF frame is similarly constructed. All devices may be operated from a d.c. voltage of -24 V, -48 V, or -60 V."

"The Frequency Plan"

"The frequency range of the 8 GHz frequency permitted in Hungary for medium and large number of channels is, according to the first Canadian amendment of CCIR 386, 7725-8275 MHz.

The following are the main characteristics of the raster:

- Up to 1,800 telephonic information channels, or an equivalent load, may be transmitted over the individual carrier frequencies.
- The frequency separation among adjacent channels operating for the same antenna in the same direction is, under identical polarization, 59.3 MHz; under opposite polarization, 29.65 MHz.
- The distance of the center gap is approximately 104 MHz; this vas chosen since we left a 50 MHz gap for satellite communications.
- There are provisions for the use of a shifted frequency plan."

The functional parts of the system, for which the major engineering data are presented, are the following:

A) Antenna and feedline system
B) Radio-frequency transmitter-receiver and switching circuit
C) Channel-reserve system
D) Automatic modem frame
E) Television terminal
F) Service multiplex system
G) Remote-control system
H) Express long-distance telephone system.

Captions of the illustrations:

Fig. 1 - The frequency plan
Fig. 2 - The block diagram of the SRF-8 frame
Fig. 3 - The block diagram of the modem frame
Fig. 4 - The block diagram of the television terminal

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PAPER COMMENTS ON PLANNED GENEVA WORLD RADIO CONFERENCE

Tunis TAP in English 1405 GMT 18 Sep 79 LD

["Pool" item; from the press review on the World Administrative Radio Conference]

[Text] Tunis, 18 Sep (TAP)--Commenting this morning the International Conference of Radio Directors which will open in Geneva within a few weeks under the sponsorship of the I.T.U., LA PRESSE writes notably; "at the Geneva meeting, the African, Asian and South American developing countries intend to claim a broader access to the radio frequencies. These frequencies being given for 20 years, the outcomes of these Geneva proceedings will certainly be essential for the future. The problem lies in the extremely rapid development of the wireless communication means. The developing countries needs increase to such a pass that the number of frequencies devolved to the third world becomes insufficient and handicaps the expansion of their own means of communication."

"Thus today 10 percent of the countries of the world dispose of 90 percent of the frequencies and the third world wants to put an end to this western monopoly. It is a question of justice and balance in the international relations, concludes the paper.

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BRIEFS

RADIO TERMINAL--Addis Ababa, 10 Sep--Ethiopia Sunday inaugurated a Japanese-built ground radio terminal for communications satellites in suburban Addis Ababa. The yen 1.4 billion terminal, built by Nippon Electric Co and Mitsubishi Electric Corp. can connect a telephone call from or to Tokyo within a few minutes through the communications satellite stationed over the Atlantic Ocean, it was reported. [Text] [Tokyo KYODO in English 0815 GMT 10 Sep 79 OW]

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